FLIGHT SUMMARY REPORT

Flight Number: 97-005-06

Calendar/Julian Date: 23 June 1997 • 174

Sensor Package: Thermal Infrared Multispectral Scanner (TIMS)
DoE Multispectral Scanner (MSS)

Area(s) Covered: Railroad Valley/White River, NV

Investigator(s): Kahle and Palluconi, JPL

Aircraft #: 799
Department of Energy
Cessna Citation

SENSOR DATA

Accession #:	-----	-----
Sensor ID #:	086	1268
Sensor Type:	TIMS	MSS
Focal Length:	-----	-----
Film Type:	-----	-----
Filtration:	-----	-----
Spectral Band:	-----	-----
f Stop:	-----	-----
Shutter Speed:	-----	-----
# of Frames:	-----	-----
% Overlap:	-----	-----
Quality:	Fair	Good

Remarks:

Airborne Science and Applications Program

The Airborne Science Branch at NASA's Dryden Flight Research Center, Edwards, California, operates two ER-2 high altitude aircraft in support of NASA earth science research. The ER-2s are used as readily deployable high altitude sensor platforms to collect remote sensing and in situ data on earth resources, celestial phenomena, atmospheric dynamics, and oceanic processes. Additionally, these aircraft are used for electronic sensor research and development and satellite investigative support.

The ER-2s are flown from various deployment sites in support of scientific research sponsored by NASA and other federal, state, university, and industry investigators. Data are collected from deployment sites in Kansas, Texas, Virginia, Florida, and Alaska. Cooperative international scientific projects have deployed the aircraft to sites in Great Britain, Australia, Chile, and Norway.

Photographic and digital imaging sensors are flown aboard the ER-2s in support of research objectives defined by the sponsoring investigators. High resolution mapping cameras and digital multispectral imaging sensors are utilized in a variety of configurations in the ER-2s' four pressurized experiment compartments. The following provides a description of the digital multispectral sensor(s) and camera(s) used for data collection during this flight.

Department of Energy Remote Sensing Laboratory

The NASA Airborne Science and Applications Program at Ames Research Center contracted with the Department of Energy Remote Sensing Laboratory (RSL) in Las Vegas, Nevada to fly the RSL Multispectral Scanner (MSS) and the NASA Thermal Infrared Multispectral Scanner (TIMS) over the desert southwest. The scanners were flown on the DOE Cessna Citation.

The Cessna Citation is a low and medium altitude, moderate speed aircraft. It can operate from 4,000 to 35,000 feet above sea level at speeds between 135 and 225 knots. There are two instrument ports in the aircraft. The RSL 1268 Multispectral Scanner was mounted over the aft port and the NASA Thermal Infrared Multispectral Scanner was mounted over the forward port.

RSL Daedalus 1268 MSS

The DOE Multispectral Scanner simulates the spectral characteristics the Thematic Mapper (TM) multispectral scanners orbiting on Landsat 4 and Landsat 5. The seven TM bands are replicated with the MSS and four additional bands of discrete wavelengths are acquired. THE MSS acquires TM band six (thermal data) as two bands in low and high gain settings. The scanner is configured as follows:

Daedalus Channel	TM Band	Wavelength, mm
1	A	0.42 - 0.45
2	1	0.45 - 0.52
3	2	0.52 - 0.60
4	B	0.60 - 0.62
5	3	0.63 - 0.69
6	C	0.69 - 0.75
7	4	0.75 - 0.90

8	D	0.91 - 1.05
9	5	1.55 - 1.75
10	7	2.08 - 2.35
11	6	8.5 - 12.5 low gain
12	6	8.5 - 12.5 high gain

Sensor/aircraft parameters are as follows:

IFOV:	2.5 mrad
Total Scan Angle:	86º
Pixels/Scan Line:	716
Scan Rate:	12.5/25/50/100 scans/second

Thermal Infrared Multispectral Scanner

The Thermal Infrared Multispectral Scanner (TIMS) is a multispectral scanning system using a dispersive grating and a six element mercury cadmium telluride detector array to produce six discrete channels in the 8.2 *mm* to 12.2 *mm* region.

Channel	Wavelength, *mm*	NET
1	8.2 - 8.6	< 0.3º C
2	8.6 - 9.0	< 0.3º C
3	9.0 - 9.4	< 0.3º C
4	9.4 - 10.2	< 0.3º C
5	10.2 - 11.2	< 0.3º C
6	11.2 - 12.2	< 0.3º C

Sensor/aircraft parameters are as follows:

IFOV:	2.5 mrad
Ground Resolution:	163 feet (50 meters) at 65,000 feet
Total Scan Angle:	76.56º
Swath Width:	16.9 nmi (31.3 km) at 65,000 feet
Pixels/Scan Line:	638
Scan Rate:	7.3 (scans/second)
Ground Speed:	400 kts. (206 m/second)

Information on data tape format, logical record format, and scanner calibration data may be obtained from the Aircraft Data Facility, NASA-Ames Research Center, Mail Stop 240-6, Moffett Field, California 94035-1000 (Telephone: 650-604-6252).

DoE DAEDALUS TMS FLIGHT DATA
FLIGHT NUMBER: 97-005-06

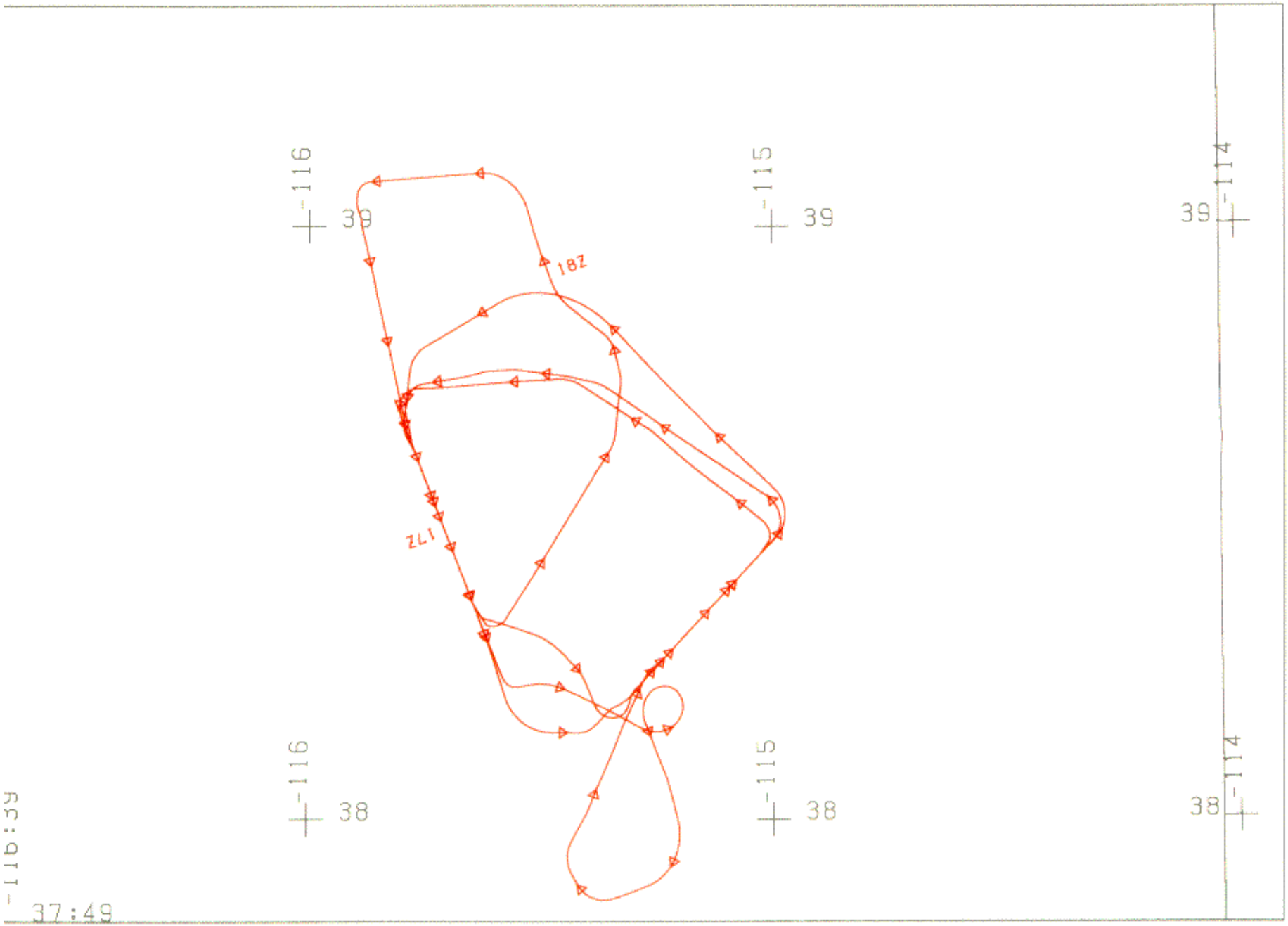
	Site	Line	Run	Actual time (GMT) begin	Actual time (GMT) end	Actual scanline begin	Actual scanline end	Altitude feet/meter	Scan Speed (rps)	total Good scanlines	total Interpolated scanlines	total Repeated scanlines
1.	740	1	1	16:39:47.1	16:44:13.0	30788	37434	13100/ 3993	25.00	6647	0	0
2.	726	1	1	16:57:37.7	17:02:44.5	47510	51345	13100/ 3993	12.50	3836	0	0
3.	740	1	2	17:25:24.4	17:29:51.2	68344	71678	24000/ 7315	12.50	3335	0	0
4.	726	1	2	17:44:06.5	17:48:49.2	82370	85903	24000/ 7315	12.50	3534	0	0
5.	726	1	3	18:16:09.2	18:20:56.9	106403	110000	24000/ 7315	12.50	3598	0	0
6.	740	1	3	18:27:34.6	18:31:50.8	114971	118174	24000/ 7315	12.50	3204	0	0
7.	726	1	4	18:43:45.8	18:48:51.8	127111	130936	24000/ 7315	12.50	3826	0	0
8.	740	1	4	18:54:49.5	18:58:53.7	135407	138460	24000/ 7315	12.50	3054	0	0

Notes: Site 726 Railroad Valley Nevada
Site 740 White River Nevada

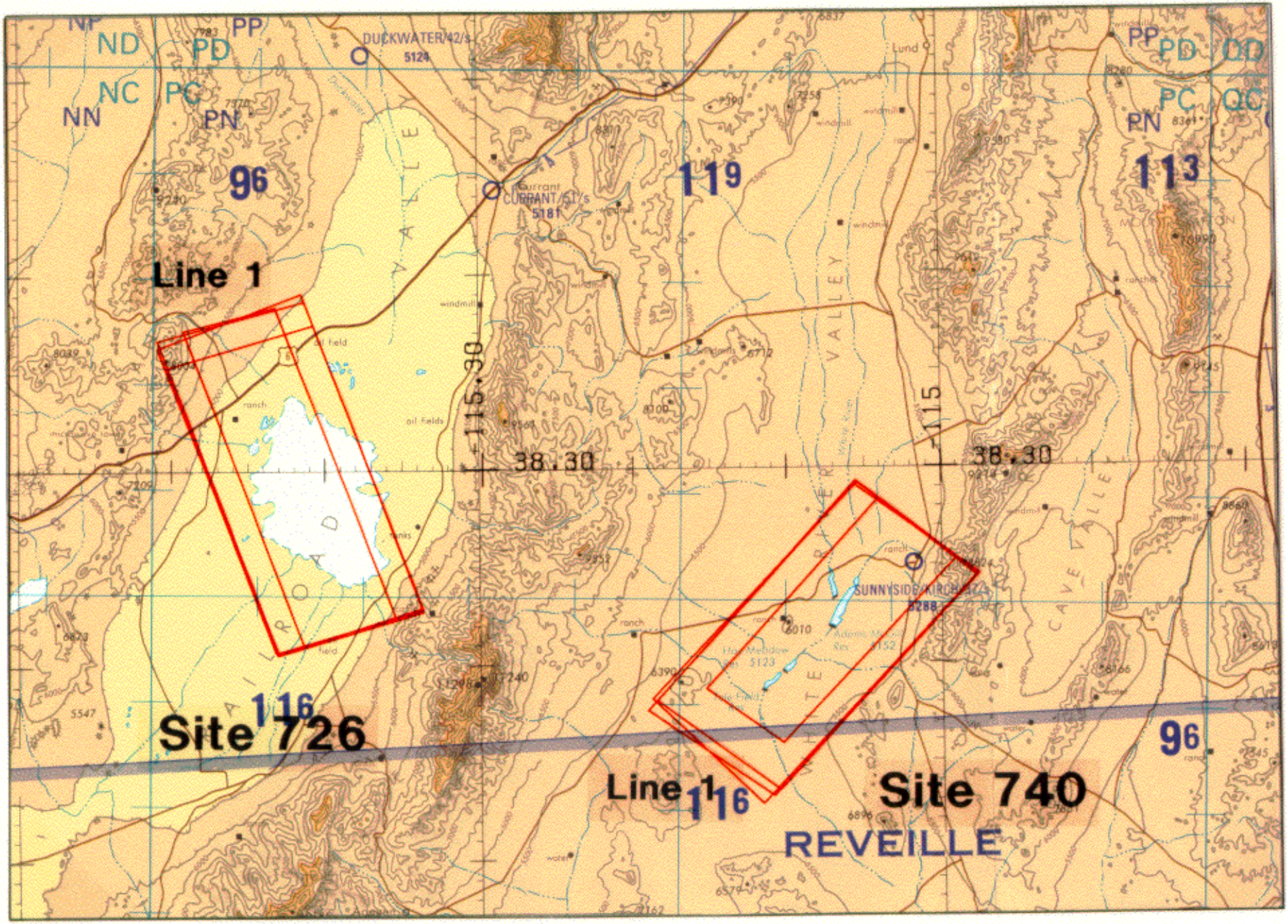
TIMS FLIGHT DATA
FLIGHT NUMBER: 97-005-06

	Site	Line	Run	Actual time (GMT) begin	Actual time (GMT) end	Actual scanline begin	Actual scanline end	Altitude feet/meter	Scan Speed (rps)	total Good scanlines	total Interpolated scanlines	total Repeated scanlines
1.	740	1	1	16:40:02.0	16:44:13.0	60558	66803	13100/ 3993	25.00	6246	0	0
2.	726	1	1	16:57:28.0	17:02:45.0	86586	94465	13100/ 3993	25.00	7880	0	0
3.	740	1	2	17:25:34.0	17:29:52.0	128527	134936	24000/ 7315	25.00	6410	0	0
4.	726	1	2	17:44:06.0	17:48:50.0	155811	162854	24000/ 7315	25.00	7021	0	23
5.	726	1	3	18:16:33.0	18:20:57.0	199577	204909	24000/ 7315	25.00	3420	1	1912
6.	740	1	3	18:27:31.0	18:31:51.0	212684	217082	24000/ 7315	25.00	1794	2	2603
7.	726	1	4	18:43:54.0	18:48:54.0	231681	238692	24000/ 7315	25.00	6166	1	845
8.	740	1	4	18:54:54.0	18:58:55.0	245868	250590	24000/ 7315	25.00	2809	0	1914

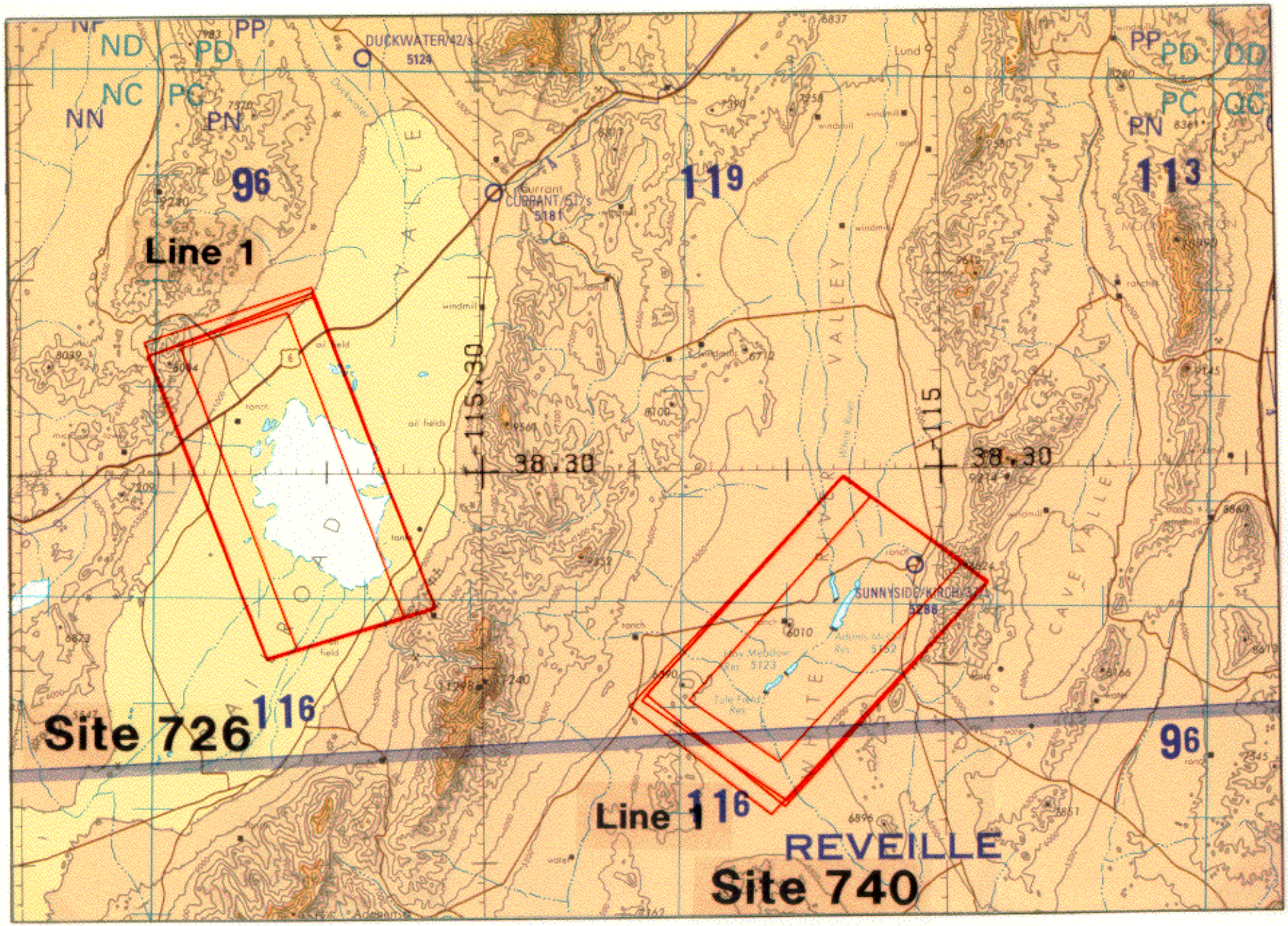
Notes: Site 726 Railroad Valley Nevada
Site 740 White River Nevada
Severe Line drops, data archived per investigator's request



FLIGHT 97-005-06 23 JUNE 1997 A/C 799 TIMS / TMS
LAMBERT CONFORMAL PROJECTION: SP1 = 37.7 SP2 = 38.9 CM = -115.4 ROTATED BY 0.0
16:39:52 TO 18:58:55 UT SCALE 1:1.00E+06 TIME TICK EVERY 3.00 MINUTES



FLIGHT 97-005-06 23 JUNE 1997 A/C 799 TIMS TPC G18-B



FLIGHT 97-005-06 23 JUNE 1997 A/C 799 DOE MSS TPC G18-B